Aetiology and management of non-specific vaginitis

I M DATTANI, A GERKEN, AND B A EVANS

From the Departments of Genitourinary Medicine and Medical Microbiology, Charing Cross Hospital (West London), London

SUMMARY In a study of 100 women with non-specific vaginitis, characterised by a vaginal discharge which was malodorous and pruritic in most cases and caused dyspareunia and dysuria in some, *Gardnerella vaginalis* was isolated in 46% of patients. When present, *G vaginalis* was significantly associated with *Mycoplasma hominis* and *Bacteroides* species. Isolation of *G vaginalis* was unrelated to the presenting symptoms. Treatment with povidone-iodine pessaries for two weeks produced no pronounced benefit, either clinically or microbiologically, compared with a placebo. Nevertheless, 68% of all patients followed reported improvement four weeks after the start of treatment. The findings suggest that *G vaginalis* is one cause of non-specific vaginitis, which is more likely to be seen in women using oral contraceptives and is usually cured spontaneously.

Introduction

A considerable number of young women complain of vaginal symptoms for which *Candida* species and *Trichomonas vaginalis* are not responsible. Gardner and Dukes[1] were the first to suggest that *Haemophilus vaginalis* (later renamed *Corynebacterium vaginale* and now called *Gardnerella vaginalis*) may be the cause. Since then they have been both supported[2-5] and opposed[6-9] in this view. For this study, a symptom-based approach was taken in order to establish a clinical picture for non-specific vaginitis, to determine its relationship to *G vaginalis* infection, and finally to examine the prognosis by a controlled trial with a broad-spectrum vaginal pessary, povidine-iodine, as the active treatment.

Patients and methods

STUDY POPULATION

Women complaining of vaginal discharge for at least one week were included in the study if neither candidal, trichomonal, or gonococcal infection could be detected. A total of 100 patients was seen by one of us (IMD) during 1978 at a department of genito-urinary medicine.

The control group comprised 100 consecutive patients seen in the same department by the same doctor. Details of age, contraceptive method, and

obstetric history were recorded. Tests for sexually transmissible disease were carried out as a routine, using standard methods for the diagnosis or exclusion of gonorrhoea, trichomoniasis, and candidosis, together with serological tests for syphilis.

CULTURE TECHNIQUES

A high vaginal swab was taken and sent to the laboratory in Stuart's transport medium. The following culture plates were inoculated: two 5% horse blood agar, one MacConkey agar, and one mycoplasma agar (base and supplement, BBL). The plates were incubated aerobically for 48 hours at 37°C, except for one blood agar plate which was placed in an anaerobic environment. The mycoplasma plates were incubated in an atmosphere of 10% CO_2 in air for five days.

IDENTIFICATION OF ORGANISMS

Organisms were identified according to standard methods.[10] *Mycoplasma hominis* was identified serologically using "taxodiscs" (BBL). *G vaginalis* was detected by the inoculation of a plate containing DST agar (Oxoid) to which 5% lysed horse blood and 2% reconstituted Isovitalex (BBL) was added. This was incubated in 10% CO_2 in air at 37°C for five days and examined daily. After 48 hours' incubation at 37°C, *G vaginalis* appeared as pinpoint grey colonies of typical short Gram-positive rods. These rapidly became Gram-variable on aging or repeated subculture. Identity was confirmed by demonstrating negative catalase, nitrate, and

aesculin reactions. Serum peptone water sugars were inoculated and showed acid production in glucose and maltose but not in lactose, mannitol, salicin, or trehalose.

TREATMENT TRIAL

A controlled double-blind trial compared povidone-iodine pessaries (Betadine 200 mg) with a placebo of identical appearance, packaged in random-numbered containers, one pessary to be used night and morning for two weeks. Patients were asked to return four weeks after the start of treatment for both clinical and microbiological assessment. All relevant data were recorded on a study form drawn up for this purpose.

Statistical analysis was carried out by means of Yates's modification of the χ^2 test.

Results

The study group of 100 women with non-specific vaginitis had a mean age of 25·6 years (range 18-54 years); 82 were single. Forty-two women had been pregnant, 54 were using oral contraception, and 16 were fitted with an intrauterine contraceptive device (IUCD).

The control group of 100 unselected female patients had a mean age of 26·0 years (range 17-50 years); 82 were single. Forty-three had been pregnant, 39 were using oral contraception, and 18 were fitted with an IUCD. There were no ethnic differences between the two groups.

SYMPTOMS

Patients were admitted to the study group on the basis of complaint of vaginal discharge shown not to be associated with trichomoniasis, candidosis, or gonorrhoea. Additional symptoms were an offensive smell (68%) and irritation (55%); dyspareunia was noted by 35% and dysuria by 23%. The existence of a discharge was confirmed in all cases, and increased redness of the vagina was recorded in 68%. Microscopy showed polymorphonuclear leucocytes in the cervical secretions of 89%.

CULTURE

The most frequently isolated organisms in both groups of patients are shown in table I. Only *G vaginalis* and *M hominis* were isolated more frequently in the study group; this was statistically significant ($\chi^2_1 = 14\cdot13$ and $8\cdot04$ respectively; P<0·001 and <0·01 respectively). In addition, *Bacteroides,* an organism of equal incidence in the control group, was found in combination with *G vaginalis* in 15 patients with vaginitis compared with five controls ($\chi^2_1 = 4\cdot5$; P = 0·05). Therefore not

TABLE I *Organisms most frequently isolated and established pathogens. (The percentage of patients harbouring G vaginalis is shown in brackets)*

Organism	Patients with non-specific vaginitis (n = 100)	Controls (n = 100)
Gardnerella vaginalis	46	20
Mycoplasma hominis	44 (64)	24 (33)
Escherichia coli	27 (30)	29 (7)
Bacteroides species	18 (83)	18 (28)
Herpes simplex virus	4 (25)	2 (0)
Neisseria gonorrhoeae		9 (44)
Trichomonas vaginalis		14 (14)
Yeasts (mostly Candida albicans)		26 (15)

only *G vaginalis* but also *M hominis* and *Bacteroides* species were significantly associated with non-specific vaginitis.

CORRELATION WITH SYMPTOMS AND ORAL CONTRACEPTION

The possibility that *G vaginalis* is responsible for the more severe forms of non-specific vaginitis was examined by looking for a correlation with more severe associated symptoms. From the results, it was apparent that no such relationship existed (table II).

Host factors which might relate to morbidity were also examined[9] (table III). Patients with *G vaginalis* vaginitis were much more likely to be taking oral contraceptives ($\chi^2_1 = 6\cdot90$; P<0·01) than patients harbouring *G vaginalis* in the control group. In the vaginitis group generally the relationship with oral contraception was less significant but still present ($\chi^2_1 = 3\cdot94$; P<0·05).

TABLE II *Relationship between common symptoms and isolation of G vaginalis. (Percentages are shown in brackets.)*

Symptoms	Isolation of G vaginalis	
	Positive (n = 46)	Negative (n = 54)
Offensive discharge	30 (65)	38 (70)
Pruritus vulvae	26 (56)	29 (54)
Offensive discharge or pruritus vulvae or both	39 (85)	44 (81)

TABLE III *Host factors and non-specific vaginitis. (The percentage of patients harbouring G vaginalis is shown in brackets.)*

Host factors	Patients with non-specific vaginitis (46)	Controls (20)
Oral contraception	54 (27)	39 (4)
Past pregnancy	42 (25)	43 (9)

TREATMENT TRIAL

The results of the treatment trial are summarised in table IV. In terms of clinical improvement assessed at four weeks, povidone-iodine pessaries were not significantly better than a placebo ($\chi^2_1 = 2 \cdot 38$; $P > 0 \cdot 05$). In fact, 58% of placebo-treated patients reported improvement, and this tendency to spontaneous cure was supported by the microbiological findings; G vaginalis was eliminated from $62 \cdot 5\%$ of the placebo-treated group at four weeks compared with 76% of the povidone-iodine-treated group. This was not significant ($\chi^2_1 = 0 \cdot 29$; $P > 0 \cdot 05$). Of the 11 patients in whom G vaginalis was isolated at follow up, seven (64%) reported that they were better, two patients reported no change, and two were worse, but one of these had a herpetic infection and the other a yeast infection.

TABLE IV *Effect of treatment with povidone-iodine on clinical and microbiological findings.*

Findings at 4 weeks	No (%) of patients after treatment with:	
	Povidone-iodine	Placebo
Clinical		
Improved	35 (76)	22 (58)
Not improved	11	16
Microbiological		
G vaginalis +	5	6
G vaginalis −	16 (76)	10 (62·5)

+ Present; − absent

Discussion

This study has produced a clear clinical picture of non-specific vaginitis: a whitish discharge with an offensive odour associated with pruritus vulvae, dyspareunia, and dysuria, in descending order of frequency. Moreover, a placebo-controlled trial showed that more than half the cases resolved spontaneously, both clinically and bacteriologically. Thus, it seems that specific treatment is not required in most cases of non-specific vaginitis and that if symptoms persist povidone-iodine may have some beneficial effect. Assessment at four weeks after diagnosis ensured that patients had completed a full menstrual cycle by the time they were re-examined, and thus the effects of menstruation were shared by all. The favourable outcome in the placebo-treated group suggested a possible beneficial effect from menstruation.

Nevertheless, the aetiology remains obscure. Since Gardner and Dukes first implicated H vaginalis in 1955, subsequent opinions have been almost equally divided on the pathogenic role of the organism. In our experience, it did not occur more frequently in the two common forms of infective vaginitis (trichomoniasis and yeast infection) than in the control group as a whole (table I), which suggests that it is not an opportunistic invader of the morbid vagina. Ingham et al[11] have suggested that anaerobes may enhance the pathogenicity of G vaginalis by interfering with phagocytosis, which gives importance to its presence in 15 out of 18 patients from whom Bacteroides species were isolated. M hominis alone may be responsible for some cases of non-specific vaginitis.[12] Pheifer et al[5] could find no relationship between non-specific vaginitis and Ureaplasma urealyticum or, for that matter, Chlamydia trachomatis.

Our findings in non-specific vaginitis point to G vaginalis as being a co-pathogen, together with M hominis or Bacteroides species or both. Exactly what circumstances favour growth of these organisms in vivo has not been established. The strong association with the presence of Bacteroides species, themselves no more frequent in non-specific vaginitis than in our controls, raises the possibility of anaerobic foci in the environment.

We also examined host factors and confirmed the relationship with oral contraceptives reported by McCormack et al[9] but not that with previous pregnancy. Oral contraception was associated not only with a greater likelihood of non-specific vaginitis but also with a much greater likelihood that the presence of G vaginalis would be associated with vaginal symptoms. Thus, the hormonal effects of oral contraceptives on vaginal epithelium may possibly promote the pathogenic potential of G vaginalis probably by enhancing its growth rate.

From our study, G vaginalis vaginitis seems likely to develop in a single woman who is taking an oral contraceptive, and cyclical changes in the vagina may well promote spontaneous resolution. These events may be mediated cytologically, a view supported by microscopical examination of the discharge showing cellular overgrowth by organisms, the 'clue cell' described by Gardner and Dukes.[1] An anaerobic environment may possibly be promoted by collections of cellular debris within the vagina. Although hormonal factors controlling maturation of vaginal epithelium may play a part, it seems reasonable that behavioural factors affecting vaginal hygiene could also be important in the development of non-specific vaginitis.

References

1. Gardner HL, Dukes CD. *Haemophilus vaginalis* vaginitis: a newly defined specific infection previously classified "non-specific" vaginitis. *Am J Obstet Gynecol* 1955; 69: 962-76.
2. Brewer JI, Halpern B, Thomas G. *Haemophilus vaginalis* vaginitis. *Am J Obstet Gynecol* 1957; 74: 834-8.
3. Dunkelburg WE jun, Hefner JD, Patow WE, Wyman FJ jun, Orup HI. *Haemophilus vaginalis* among asymptomatic women. *Obstet Gynecol* 1962; 20: 629-36.
4. Josey WE, McKenzie WJ, Lambe DW jun. *Corynebacterium vaginale (Haemophilus vaginalis)* in women with leukorrhea. *Am J Obstet Gynecol* 1976; 126: 574-8.
5. Pheifer TD, Forsyth PS, Durfee MA, Pollock HM, Holmes KK. Non-specific vaginitis. Role of *Haemophilus vaginalis* and treatment with metronidazole. *N Engl J Med* 1978; 298: 1429-33.
6. Heltai A, Taleghany P. Non-specific vaginal infections. A critical evaluation of *Haemophilus vaginalis*. *Am J Obstet Gynecol* 1959; 77: 144-51.
7. Frampton J, Lee Y. Is *Haemophilus vaginalis* a pathogen in the female genital tract? *Journal of Obstetrics and Gynaecology of the British Commonwealth*, 1964; 71: 436-44.
8. Corbishley CM. Microbial flora of the vagina and cervix. *J Clin Pathol* 1977; 30: 745-8.
9. McCormack WM, Hayes CH, Rosner B, *et al.* Vaginal colonisation with *Corynebacterium vaginale (Haemophilus vaginalis)*. *J Infect Dis* 1977; 136: 740-5.
10. Cowan ST, Steel KJ. *Manual for the identification of Medical Bacteria*. 2nd ed. London: Cambridge University Press, 1974.
11. Ingham HR, Sisson PR, Tharagonnet D, *et al.* Inhibition of phagocytosis in vitro by obligate anaerobes. *Lancet* 1977; ii: 1252-4.
12. McCormack WM, Braun P, Yhu-Hsiung L, Klein JO, Kass EH. Medical progress: the genital mycoplasmas. *N Engl J Med* 1973; 2: 78-88.